

In re Application of: HERZBERG
Serial No.: 10/511,859
Filed: October 18, 2004
Office Action Mailing Date: June 11, 2007

Examiner: FLORES
Group Art Unit: 2611
Attorney Docket: 37476

In the Claims:

1. (Currently amended) A method of analyzing the performance of a modem connection, comprising:

connecting a line interface to a communication link carrying data and other signals of a modem connection, between a pair of end modems;

collecting data and other signals passing on the communication link, between the end modems, through the line interface;

determining, by a processor, an information content of one or more data and other signals transmitted between the end modems, responsive to data and other signals collected through the line interface; and

displaying information on the modem connection, responsive to the determined information content.

2. (Original) A method according to claim 1, wherein the modem connection comprises a full-duplex modem connection.

3. (Previously presented) A method according to claim 1, wherein the modem connection comprises an ADSL modem connection.

4. (Previously presented) A method according to claim 1, wherein connecting the line interface to the communication line comprises connecting at a point at least two times closer to one of the modems than the other modem.

5. (Previously presented) A method according to claim 1, wherein connecting the line interface to the communication line comprises connecting at a point at most two times closer to one of the modems than to the other modem.

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6. (Currently amended) A method according to claim 1, wherein collecting data and other signals passing on the communication link comprises collecting without sending to either of the modems acknowledgment signals or any other modem tangible signals.
7. (Previously presented) A method according to claim 1, wherein displaying information on the modem connection comprises displaying the contents of one or more modem negotiation signals.
8. (Previously presented) A method according to claim 1, wherein displaying information on the modem connection comprises providing information on noise levels on the connection.
9. (Previously presented) A method according to claim 8, wherein providing information on noise levels on the connection comprises suggesting, by the processor, possible sources of the noise.
10. (Currently amended) A method according to claim 8, wherein displaying information on the modem connection comprises showing cross-references matching ~~by the processor~~, between effects in upper layers and noise levels on the connection at specific times.
11. (Currently amended) A method according to claim 1, comprising determining, by the processor, information on the symbol mapping used by the connection, ~~responsive to~~ based on the collected data and other signals.
12. (Previously presented) A method according to claim 1, wherein displaying information on the modem connection comprises displaying information on signaling signals transmitted in parallel to data transmission.

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13. (Previously presented) A method according to claim 1, comprising performing signal tests on test signals collected through the line interface and comparing the results of the tests to negotiation signals, collected through the line interface, reporting test results from one of the modems.
14. (Previously presented) A method according to claim 1, comprising injecting through the line interface noise which forces a retrain of the modem connection.
15. (Original) A method according to claim 14, wherein injecting the noise comprises injecting noise in a manner which does not substantially interfere with a different connection passing on the communication link.
16. (Previously presented) A method according to claim 14, wherein injecting the noise comprises connecting a low impedance circuit, for at least some of the frequency bands carrying signals, to the communication link.
17. (Previously presented) A method according to claim 14, wherein the modem connection comprises a DSL connection.
18. (Original) A method according to claim 17, wherein the injected noise does not interfere with voice frequency bands of the communication link.
19. (Previously presented) A method according to claim 1, wherein the modem connection comprises a voice band modem connection.
20. (Currently amended) A method according to claim 1, comprising identifying changes in the operation of the modem connection responsive to the data and other

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signals collected through the line interface and providing suggested causes of the changes.

21. (Original) A method according to claim 20, wherein identifying changes comprises identifying a retrain.

22. (Previously presented) A method according to claim 20, wherein identifying changes comprises identifying a bit swap.

23. (Previously presented) A method according to claim 20, wherein providing suggested causes of the changes comprises identifying, for at least one change, a noise that caused the change.

24. (Previously presented) A method according to claim 1, comprising identifying data retransmissions and providing suggested causes of the data retransmissions.

25. (Currently amended) A method according to claim 1, wherein displaying information on the determined characteristics comprises displaying a raw bit content of the data and other signals transmitted on the modem connection.

26. (Currently amended) A method of analyzing the performance of a modem connection, comprising:

connecting a line interface to a communication link carrying signals of a modem connection, between a pair of end modems;

collecting modem negotiation signals passing on the communication link, between the end modems, through the line interface;

analyzing the collected modem negotiation signals; and

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providing a warning on a possible tapping of the communication link, responsive to the analysis.

27. (Currently amended) A method according to claim 1, comprising extracting the data transmitted on the modem connection, from the data and other signals collected through the line interface.

28. (Currently amended) A modem connection performance analyzer, comprising:

- a line interface adapted to collect data and other signals of a modem connection passing on a communication link, between two end modems connected to the link;

- a processor adapted to determine an information content of one or more data and other signals passing on the modem connection, responsive to the collected data and other signals; and

- a human interface adapted to provide information on the determined information content.

29. (Original) A performance analyzer according to claim 28, comprising a low impedance shorting circuit adapted to short at least some of the frequencies of the communication link, responsive to a command from the processor.

30. (Currently amended) A method of monitoring an xDSL modem connection, comprising:

- connecting a line interface to a communication link carrying data and other signals of an xDSL modem connection, between a pair of end modems separate from the line interface;

- collecting data and other signals passing between the end modems on the communication link, through the line interface, by a performance analyzer, during a

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collection session in which data and other signals are not injected by the performance analyzer onto the communication link, except possibly noise adapted to cause a retrain, injected at specific times; and

providing information on the operation of the modem connection, responsive to the collected data and other signals, by providing data passing on the connection.

31. (Cancelled)

32. (Cancelled)

33. (Currently amended) A method of forcing a retrain on a modem connection, comprising:

determining at least one first frequency band to be disrupted; and

connecting to a communication line carrying the modem connection, between two end modems, a circuit which disrupts transmission of signals on the at least one first frequency band substantially without interfering with data and other signals of a second frequency band.

34. (Original) A method according to claim 33, wherein determining the at least one first frequency band to be disrupted comprises determining a frequency band including a pilot tone frequency band of the modem connection.

35. (Cancelled)

36. (Currently amended) A method according to claim ~~33~~³⁴, wherein the second frequency band comprises a frequency band of voice signals.

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37. (Currently amended) A method according to claim 3335, wherein connecting the disruption circuit comprises connecting a circuit which shorts the at least one first frequency band without shorting the second frequency band.

38. (Original) A method according to claim 33, wherein connecting the disruption circuit comprises connecting a circuit which injects noise at the at least one first frequency band.

39. (Currently amended) A method according to claim 1, wherein determining the information content of the one or more data and other signals comprises determining a bit content.

40. (Currently amended) A method according to claim 1, comprising determining a stage of the modem connection, responsive to the collected data and other signals.

41. (Previously presented) A method according to claim 1, wherein the only modem tangible signals transmitted on the connection during the collection of the signals through the line interface are generated by the end modems.

42. (Currently amended) A method according to claim 1, wherein at least some of the data and other signals collected through the line interface are generated by at least one of the pair of end modems without relation to the collection of the signals to the line interface sending acknowledgment signals or any other modem tangible signals to either of the modems.

43. (Previously presented) A method according to claim 1, wherein the processor is not connected to the end modems other than through the line interface.

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44. (Currently amended) A method according to claim 1, wherein collecting data and other signals passing on the communication link comprises collecting during a collection session in which data and other signals are not injected through the line interface onto the communication link, except possibly noise adapted to cause a retrain, injected at specific times.

45. (New) A method according to claim 8, wherein displaying information on the modem connection comprises suggesting, by the processor, possible correlation between data retransmissions or connection retrains and noise.

46. (New) A method according to claim 1, wherein the information content comprises at least one value of a field of the one or more data and other signals.

47. (New) A method according to claim 1, wherein the information content comprises negotiation signal content.

48. (New) A method according to claim 1, and further comprising using a state machine for keeping track of the state of the modem connection, based, at least partly, on the determined information content.

49. (New) A performance analyzer according to claim 28, wherein the information content comprises negotiation signal content.

50. (New) A performance analyzer according to claim 28, wherein the information content comprises at least one value of a field of the one or more data and other signals.

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51. (New) A performance analyzer according to claim 28 and further comprising a state machine, the state machine keeping track of the state of the modem connection based, at least partly, on the determined information content.